great themes, to search out the propulsive force which has driven and yet drives, organism on its eventful evolutionary voyages, and to scan the heavens to discover what may be the star whereby evolution has steered its immemorial course."

The book gives little space to figures or tables. Those that are used are carefully chosen. The fifty-one illustrations are all good but not evenly distributed. In describing the vascular system of stems and roots, eleven excellent photomicrographs are used, some chapters have but one or two illustrations. The book should prove of value to everyone interested in plants. The botanist will find known facts presented in a new, stimulating manner, the student will find clear, up-to-date statements of the essentials of plant physiology and the general reader will get a glimpse of a fascinating world of action.

George T. Hastings

THE LONDON CATALOGUE OF BRITISH PLANTS

There are two stages in the history of any scientific undertaking which are most productive of interesting results. One is the pioneer stage, when novelties, facts or ideas, crowd to be recorded, and the observer feels that he is laying the foundations of a structure, the size and importance of which he can only surmise. The other stage is that when the final structure appears to take shape, and out of the labors of years the more or less finished product begins to be realized. I say more or less finished because it is soon discovered that the apparent completion is deceptive in so far as it represents only a stage in the development of the science, a development which will never cease so long as the human mind remains active and progressive.

The American botanist, accustomed to our vast and only partially exploited resources, may regard the small British flora with a certain measure of indifference if not contempt. Was it not well known a century ago, and does it not seem that modern students, in their efforts to discover new facts in such a field, are merely dealing with trifles? But the truth is, that the British flora, just because it has been so intensively studied, can teach us many things. It is by no means completely known, but its larger features are clearly perceptible and every new observation fits into the scheme of things and has a significant meaning. We are at the stage when analysis permits synthesis, and the scientific harvest can be gathered in.

Perhaps the most indispensable publication on British plants is the London Catalogue, which covers the flowering plants, ferns and their allies, and Charophyta. It enumerates all the species, giving the number of geographical units in which each is found, and indicating which are native, which introduced. The first edition was published in 1844. The one current when I began to study botany was the seventh. It bears no date, but was published in 1874, according to a statement in the eighth edition. My copy refers to the year 1880 in an advertisement on the cover, so I suppose it represents a later impression. The eighth edition appeared in 1886, and was reprinted in 1890; I possess the reprint. The ninth edition is dated 1895. The last published, the eleventh, has recently (late in 1925) appeared. It is interesting to note the increase in recorded species of flowering plants: 1601 in the seventh edition, 1760 in the eighth, 1861 in the ninth, 2256 in the eleventh. This increase is partly due to "splitting," partly to the discovery of plants hitherto overlooked, partly to the naturalization of aliens. The aliens are less numerous than one might expect; thus it is much easier for European weeds to get established in North America than vice versa. In the eleventh edition the plants which are certainly or most probably aliens include about 267 species, which is after all more than one in ten. These include some of the well established and familiar species, such as *Lychnis githago*, *Centaurea cyanus*, etc., which now have the aspect of natives. A very striking feature is the enormous number of hybrids, along with the fact that they are reported only in certain genera. The eleventh edition records the following hybrids: *Ranunculus*, 4 (all in *Batrachium*); *Papaver*, 1; *Fumaria*, 1; *Nasturtium*, 1; *Helianthemum*, 2; *Viola*, 11; *Polygala*, 1; *Silene*, 1; *Lychnis*, 1; *Cerastium*, 3; *Sagina*, 1; *Spergularia*, 2; *Hypericum*, 1; *Geranium*, 1; (not one in Leguminosae); *Prunus*, 1; *Rubus*, 23; *Geum*, 1; *Potentilla*, 3; *Rosa*, 26; *Sorbus*, 3; *Saxifraga*, 3; *Drosera*, 1; *Epilobium*, 35; *Apium*, 1; *Galium*, 2; *Erigeron*, 1; *Bidens*, 1; *Senecio*, 3; *Arctium*, 1; *Carduus*, 1; *Cnicus* (i. e.

Cirsium), 7; *Centaurea*, 2; (none in *Hieracium*); *Sonchus*, 1; *Tragopogon*, 1; *Vaccinium*, 1; *Erica*, 4; *Limonium*, 1; *Armeria*, 1; *Primula*, 3; *Erythraea*, 1; *Gentiana*, 1; *Symphytum*, 1; *Verbascum*, 5; *Scrophularia*, 1; *Euphrasia*, 16; *Utricularia*, 1; *Pingnicula*, 1; *Mentha*, 8; *Scutellaria*, 1; *Prunella*, 1; *Stachys*, 1; *Lamium*, 1; *Ajuga*, 1; *Chenopodium*, 1; *Salicornia*, 5; *Polygonum*, 8; *Rumex*, 16; *Euphorbia*, 1; *Ulmus*, 3; *Betula*, 2; *Quercus*, 1; *Salix*, 70 (many multiple); *Populus*, 1; *Epipactis*, 1; *Anacamptis*, 1 (bigeneric, with *Gymnadenia*); *Orchis*, 15; *Ophrys*, 4; *Gymnadenia*, 6 (all bigeneric with *Cocloglossum*, *Leucorchis*, and *Orchis*); *Coeloglossum*, 2 (both bigeneric with *Orchis*); *Platanthera*, 1 (bigeneric with *Orchis*); *Juncus*, 3; *Luzula*, 1; *Sparganium*, 1; *Potamogeton*, 19; *Zostera*, 1; *Scirpus*, 1; *Carex*, 31; *Alopecurus*, 1; *Polypogon*, 1 (bigeneric with *Agrostis*); *Koeleria*, 1; *Glyceria*, 3; *Festuca*, 2; *Agropyron*, 2. In all, 303 plant forms regarded as hybrids, eleven of them between different genera. We are usually left to assume that these are first generation hybrids, but this may not always be the case, and cannot be in the multiple *Salix* hybrids.

The known polymorphism of certain species is only partly dealt with and it is stated that the many forms of *Capsella* and *Taraxacum* have been purposely omitted. Nevertheless, 46 varieties or races are listed under *Rosa canina*. *Rosa involuta* and *R. hibernica*, long considered species, now stand as hybrids. I am glad to see *Anagallis foemina* Mill. (*coerulea* Schreb.) given as a distinct species, as I have long so regarded it. The dimorphism of *Digitalis*, observed by Miss Saunders, is not recognized.

A matter of special interest to us in America is the number of species in several genera, as compared with the number in our flora. Thus Britain is extremely rich in *Rubus* and *Hieracium*, but very poor in *Aster*, *Oxytropis*, *Clematis*, *Quercus*, etc. The recent investigations of C. C. Hurst on *Rosa* may throw a flood of light on these phenomena. The groups in which there is great diversity, with a large number of species, may be expected to be found, when their chromosomes are examined, to be polyploid. Such polyploid species, according to Hurst's observations on *Rosa*, may give rise to diploids, which if they survive will remain relatively constant, with only small variations. They can only do otherwise through a slow process of mutation, which involves heavy risks, many mutations being lethal, others disadvantageous. But the polyploid species may themselves have arisen by duplication, combined with mutation, and hence it appears that those regions characterized by polyploids, while not necessarily the original homes of the genera concerned, have at least been inhabited by them a very long while. Consequently the cytology of all these plants acquires a new interest, and the chromosome count is no longer merely a matter of record, lacking special significance. For instance, with reference to the very recent (Botanical Gazette, April, 1926) discussion of *Xanthium* by Symons, it seems possible that the true *X. Wootoni* will be found to have fewer chromosomes than those allied species which occasionally produce *Wootoni*-like burrs. If so, the genuine *X. Wootoni* will always breed true, as it did in the experiments of DeVries.

I notice only one misprint in the eleventh edition: *Hippophæ* for *Hippophaë*. To the American botanist some of the generic arrangements will seem illogical, and indeed the amount of generic division allowed seems to vary with the authority who last revised the group. These catalogues are certainly most useful, and stimulating to botanists in the regions where they are used. It would be a great service to American botany to issue a series of similar lists, dealing with the various major divisions of our country. It is important that the price should be low. The eleventh edition of the London Catalogue, though well printed on good paper, is sold for ten pence (20 cents), and may be had interleaved and bound in limp cloth for a shilling and sixpence. The publisher is Geo. Bell and Sons, 6 Portugal Street, W. C., London.

T. D. A. Cockerell

"TROPICAL WOODS"

In March, 1925, the School of Forestry of Yale University began the publication, under the name "Tropical Woods," of a small quarterly journal which, under the efficient editorship of Prof. Samuel J. Record, has now reached its seventh number. It is devoted to the forestry and botany of tropical trees, with special reference to those of America. The first five numbers were distributed gratuitously and widely, but with the sixth the